Amendments to the Claims:

This listing of the claims will replace all prior versions, and listings, of the claims in the application:

1. (Currently Amended) A system for optical tomography, comprising:

an apparent light source configured to project excitation light toward a specimen having fluorescent proteins therein, wherein the excitation light enters the specimen becoming intrinsic light within the specimen, wherein the intrinsic light is configured to excite fluorescent light from the fluorescent proteins, and wherein at least one of the intrinsic light or the fluorescent light has a wavelength ~~in~~ within a visible wavelength range, the visible wavelength range spanning from about 400 nanometers to about 700 nanometers; ~~and outside of a near infrared range~~

a light detector configured to receive the intrinsic light exiting the specimen and configured to receive the fluorescent light exiting the specimen; and

an image processor coupled to the light detector and configured to use a light propagation model, wherein the light propagation model is configured to predict propagation of visible light in a diffuse medium, wherein the image processor comprises a diffusion equation processor configured to use a diffusion equation having a modified diffusion coefficient selected in accordance with the propagation of visible light in the diffuse medium throughout a substantial portion of the visible wavelength range.

2. (Previously Presented) The system of Claim 1, wherein the intrinsic light and the fluorescent light are diffuse.

3. (Currently Amended) The system of Claim 1, wherein the fluorescent light has a wavelength in the visible wavelength range and outside of ~~the~~ a near infrared range.

4. (Previously Presented) The system of Claim 1, wherein the fluorescent light has a wavelength in a red portion of the visible wavelength range.

5. (Currently Amended) The system of Claim 1, wherein the fluorescent light has a wavelength in ~~the~~ a near infrared range.

6. (Currently Amended) The system of Claim 1, ~~further including:~~

~~a light detector configured to receive the intrinsic light exiting the specimen and configured to receive the fluorescent light exiting the specimen,~~ wherein the light detector is further configured to convert the received intrinsic light into first image information, and further configured to convert the received fluorescent light into second image information, ~~; and~~

~~an image processor coupled to the light detector and configured to generate a light propagation model, wherein the light propagation model is configured to predict propagation of visible light in a diffuse medium,~~ and wherein the image processor is further configured to combine the first image information, the second image information, and the light propagation model, and further configured to provide a tomographic image of the fluorescent proteins. ~~, wherein the light propagation model is configured to predict the propagation of the visible light in the visible wavelength range and outside of the near infrared range.~~

7. (Currently Amended) The system of Claim 6, wherein the ~~image processor includes a diffusion equation processor that uses a diffusion equation having a~~ modified diffusion coefficient ~~selected in accordance with the propagation of the visible light and associated with at least one of the intrinsic light or the fluorescent light.~~ has the form $D_{\alpha} = \frac{1}{3(\mu_s' + \alpha\mu_a)}$, where α is a constant having a value depending on absorption, scattering, and anisotropy of the diffuse medium, μ_s' is a reduced scattering coefficient, and μ_a is an absorption coefficient.

8. (Previously Presented) The system of Claim 6, wherein the light detector is selectively movable to receive the intrinsic light and fluorescent light on a plurality of light paths relative to the specimen.

9. (Previously Presented) The system of Claim 6, further including an optical scanner to provide the intrinsic light and fluorescent light to the light detector on a plurality of light paths relative to the specimen.

10. (Previously Presented) The system of Claim 1, wherein the apparent light source includes a light directing device to selectively move a projection direction of the apparent light source to direct the excitation light on a plurality of light paths toward the specimen.

11. (Previously Presented) The system of Claim 10, wherein the light directing device includes an optical switch to selectively move the projection direction of the apparent light source to provide the plurality of light paths toward the specimen.

12. (Previously Presented) The system of Claim 10, wherein the light directing device includes a movable mirror to selectively move the projection direction of the apparent light source to provide the plurality of light paths toward the specimen.

13. (Previously Presented) The system of Claim 10, wherein the light directing device is configured to selectively move the projection direction of the apparent light source in translation along at least one apparent light source translation axis.

14. (Original) The system of Claim 1, wherein the specimen is selectively movable to provide the excitation light on a plurality of light paths relative to the specimen.

15. (Previously Presented) The system of Claim 14, wherein the specimen is selectively movable in rotation about a specimen rotation axis.

16. (Previously Presented) The system of Claim 14, wherein the specimen is selectively movable in translation along at least one specimen translation axis.

17. (Previously Presented) The system of Claim 14, wherein the specimen is selectively movable in rotation about a specimen rotation axis and the specimen is further selectively moveable in translation along at least one specimen translation axis.

18. (Previously Presented) The system of Claim 1, wherein the apparent light source includes a light directing device to selectively move a projection direction of the apparent light source to direct the excitation light on a plurality of light paths toward the specimen and the specimen is selectively movable to provide the excitation light on a plurality of light paths relative to the specimen.

19. (Original) The system of Claim 1, wherein the intrinsic light passes through the specimen as transillumination light.

20. (Original) The system of Claim 1, wherein the intrinsic light reflects from the specimen as reflectance light.

21. (Currently Amended) A method of optical tomography, comprising:

generating excitation light with an apparent light source configured to project the excitation light toward a specimen having fluorescent proteins therein, wherein the excitation light enters the specimen becoming intrinsic light within the specimen, wherein the intrinsic light is configured to excite fluorescent light from the fluorescent proteins, and wherein at least one of the intrinsic light or the ~~emitted~~ fluorescent light has a wavelength ~~in~~ within a visible wavelength range, the visible wavelength range spanning from about 400 nanometers to about 700 nanometers; ~~and outside of a near infrared range.~~

receiving the intrinsic light exiting the specimen;

receiving the fluorescent light exiting the specimen;

analyzing the at least one of the intrinsic light or the emitted light with a light propagation model configured to predict propagation of visible light in a diffuse medium, wherein the light propagation model is configured to predict the propagation of the visible light having a wavelength in the visible wavelength range, wherein the light propagation model is generated in accordance with a solution to a diffusion equation having a modified diffusion coefficient selected in accordance with the propagation of visible light in the diffuse medium throughout a substantial portion of the visible wavelength range.

22. (Previously Presented) The method of Claim 21, wherein the intrinsic light and the fluorescent light are diffuse.

23. (Currently Amended) The method of Claim 21, wherein the fluorescent light has a wavelength in the visible wavelength range and outside of ~~the~~ a near infrared range.

24. (Previously Presented) The method of Claim 21, wherein the fluorescent light has a wavelength in a red portion of the visible wavelength range.

25. (Currently Amended) The system of Claim 21, wherein the fluorescent light has a wavelength in ~~the~~ a near infrared range.

26. (Currently Amended) The method of Claim 21, further comprising:

~~receiving the intrinsic light exiting the specimen;~~

~~receiving the fluorescent light exiting the specimen;~~

converting the received intrinsic light into first image information;

converting the received fluorescent light into second image information; and

~~using a light propagation model configured to predict propagation of the visible light in a diffuse medium, wherein the light propagation model is configured to predict the propagation of~~

~~visible light having a wavelength in the visible wavelength range and outside of the near infrared range; and~~

combining the first image information, the second image information, and the light propagation model to provide a tomographic image of the fluorescent proteins.

27. (Previously Presented) The method of Claim 26, wherein the receiving the intrinsic light and the receiving the fluorescent light include receiving the intrinsic light and receiving the fluorescent light with a selectively movable light detector configured to receive the intrinsic light and fluorescent light on a plurality of light paths relative to the specimen.

28. (Currently Amended) The method of Claim 26, wherein the ~~light propagation model is generated in accordance with a solution to a diffusion equation having a~~ modified diffusion coefficient ~~selected in accordance with the propagation of the visible light and associated with at least one of the intrinsic light or the fluorescent light.~~ has the form $D_\alpha = \frac{1}{3(\mu_s' + \alpha\mu_a)}$ where α is a constant having a value depending on absorption, scattering, and anisotropy of the diffuse medium, μ_s' is a reduced scattering coefficient, and μ_a is an absorption coefficient.

29. (Previously Presented) The method of Claim 21, further comprising selectively moving a projection direction of the apparent light source to direct the excitation light on a plurality of light paths toward the specimen.

30. (Previously Presented) The method of Claim 29, wherein the apparent light source includes an optical switch to selectively move the projection direction of the apparent light source.

31. (Original) The method of Claim 29, wherein the apparent light source includes a selectively movable mirror to selectively move the apparent light source.

32. (Previously Presented) The method of Claim 29, wherein the selectively moving the projection direction of the apparent light source includes selectively moving the projection direction of the apparent light source in translation along at least one apparent light source translation axis.

33. (Previously Presented) The method of Claim 21, further comprising selectively moving the specimen to provide the excitation light on a plurality of light paths relative to the specimen.

34. (Original) The method of Claim 33, wherein the selectively moving the specimen includes selectively moving the specimen in rotation about a specimen rotation axis.

35. (Original) The method of Claim 33, wherein the selectively moving the specimen includes selectively moving the specimen in translation along at least one specimen translation axis.

36. (Original) The method of Claim 33, wherein the selectively moving the specimen includes:

selectively moving the specimen in rotation about a specimen rotation axis; and

selectively moving the specimen in translation along at least one specimen translation axis.

37. (Previously Presented) The method of Claim 21, further comprising:

selectively moving a projection direction of the apparent light source to direct the excitation light on a plurality of light paths toward the specimen; and

selectively moving the specimen to provide the excitation light on another plurality of light paths relative to the specimen.

38. (Original) The method of Claim 21, wherein the intrinsic light passes through the specimen as transillumination light.

39. (Original) The method of Claim 21, wherein the intrinsic light reflects from the specimen as reflectance light.

40. (Currently Amended) A system for optical tomography, comprising:

at least one selectively movable component to selectively move a projection direction of ~~the~~ an apparent light source to direct a plurality of light paths toward a specimen, wherein the at least one selectively movable component includes a selectively movable structure comprising an optical fiber, wherein the selectively movable structure is configured to move the optical fiber to a plurality of physical locations to provide the plurality of light paths.

41. (Original) The system of Claim 40, wherein the selectively movable component includes at least one selectively movable mirror.

42 – 43 (Canceled)

44. (Previously Presented) The system of Claim 1, wherein at least one of the intrinsic light or the emitted light propagate through the specimen a distance of at least 0.5 mm.

45. (Previously Presented) The method of Claim 21, wherein at least one of the intrinsic light or the emitted light propagate through the specimen a distance of at least 0.5 mm.

46. (Canceled)

47. (Currently Amended) The system of Claim 1, wherein the intrinsic light has a wavelength in the visible wavelength range and outside of ~~the~~ a near infrared range.

48. (Canceled)

49. (Currently Amended) The method of Claim 21, wherein the intrinsic light has a wavelength in the visible wavelength range and outside of ~~the~~ a near infrared range.

50. (New) The system of Claim 1, wherein the modified diffusion coefficient is selected in accordance with the propagation of visible light in the diffuse medium down to a smallest wavelength of about 400 nanometers.

51. (New) The method of Claim 21, wherein the modified diffusion coefficient is selected in accordance with the propagation of visible light in the diffuse medium down to a smallest wavelength of about 400 nanometers.